

## **GRADE 6 SCIENCE**

The goal of St. Michael School grade six science program is to help students develop a foundation in earth, physical, and life sciences. This is achieved through lectures, activities, small group discussions, debates, current event analyses, and laboratory experiments. Classroom activities are supplemented by readings from the textbook series.

### **Earth and Space Science**

Students will:

- learn the principles of plate tectonics. Specifically, the students will
  - understand that the surface of the earth is in constant movement and that the present features of the earth come from ongoing history
  - differentiate between the layers of the earth including the crust, the mantle, the outer core, and the inner core
  - describe the movements of the crustal plates which lead to both slow (e.g., formation of mountains and ocean basins) and rapid (e.g., earthquakes and volcanoes) changes in the earth's surface
  - recognize the evidence for long-term movement of plates
- understand basic oceanography. Specifically, the student will
  - differentiate between the surface of the ocean, the subsurface land features, and the ocean bottom
  - understand that the composition of seawater is a dilute solution of salts which come from weathering and erosion of continental rocks
  - be able to explain the cause and effects of surface currents, subsurface currents, tides, and waves
- learn the principles of astronomy. Specifically, the student will
  - describe the concept of gravity including Newton's law of universal gravitation
  - learn about the different type of stars, supernovas, black holes, and constellations
  - understand that astronomical distance is measured in light years
  - recognize that the earth is made up of countless galaxies

### **Life Science**

Students will:

- understand basic marine life. Specifically, the student will
  - learn that life zones are determined by the depth to which light can penetrate making photosynthesis possible and by the availability of nutrients
  - differentiate the classifications of marine life including bottom living, free-swimming, and small drifting plants and animals
  - understand the difference and importance of phytoplankton versus zooplankton
  - learn that deepwater life depends on organic matter from above.

- Learn about the circulatory and lymphatic system. Specifically, the student will
  - understand the relationship between the structure and function of the heart and the blood vessels
  - learn about systemic and pulmonary circulation
  - describe the main components of blood
  - understand cardiovascular disease including the causes and prevention
  
- Understand that the immune system fights infections from bacteria, viruses and fungi. Specifically, the student will
  - Learn about white blood cells, antibodies, and antigens
  - Describe the role of vaccines in preventing communicable diseases and epidemics
  - Differentiate between viral and bacterial diseases

## **Physical Science**

Students will:

- Learn the principles of energy. Specifically, the student will
  - Describe the six forms of energy including mechanical, heat, electrical, wave, chemical and nuclear
  - Understand that many forms of energy are interchangeable
  - Learn the sources of energy
  - Understand the limitations of fossil fuels including the environmental impact and the finite nature of fossil fuels
  - Describe nuclear energy including safety concerns in the production and usage of nuclear energy
  
- Understand the principles of heat. Specifically, the student will
  - Learn about heat and temperature
  - Differentiate between conduction, convection, and radiation
  
- learn about energy transfer. Specifically, the student will
  - describe states of matter (solid, liquid, gas) in terms of molecular motion
  - understand that a change of phase is a physical change and can occur by adding or removing energy
  - differentiate between expansion and contraction
  - learn about the changing phases including condensation, freezing, melting, and boiling
  - understand the process of and application of distillation

### **Laboratory investigations**

Students will:

- learn basic laboratory safety
- understand the use of laboratory equipment
- describe and apply the scientific method
- conduct experiments that directly link to topics being taught

### **Science Biographies**

Students will:

- learn about scientists who have been instrumental in our understanding of the world that surrounds us. Efforts are made to place equal emphasis on female scientists and those from a variety of ethnic backgrounds.
  - Marie Curie
  - Lewis Howard Latimer
  - Charles Drew
  - Dr. Daniel Hale Williams
  - Isaac Newton
  - Alfred Wegner
  - Charles Darwin
  - Mary Anning
  - Antoine Lavoisier
  - Lise Meitner
  - Dmitri Mendeleev
  - Rosalind Franklin
  - Francis Crick
  - James Watson
  - Severo Ochoa
  - Barbara McClintock
  - Albert Einstein
  - Dorothy Hodgkin
  - James Maxwell
  - Charles Steinmeitz
  - Elizabeth Blackwell
  - George Washington Carver

## **Materials**

- Prentice Hall Science Series
  - The Nature of Science
  - Exploring Planet Earth
  - Exploring the Universe
  - The Dynamic Earth
  - Heat Energy
  - The Human Biology and Health
- Material from the world wide web
- Teacher created materials

## **Instruction**

- Classroom lectures
- Group discussions
- Small group presentations
- Science Fair
- Debates
- Laboratory Experiments and Dissections
- Twice monthly current event analyses
- Interactive presentations given by William Anderson of RE-SEED to illustrate principles of physical science

## **Sources:**

E.D. Hirsch Curriculum

Massachusetts Science and Technology/Engineering Curriculum Framework (2001)

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